MAI-2005-22

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Granite)

Fatal Falling or Sliding Material Accident
August 27, 2005

Albert Frei & Sons, Inc.
Walstrum Mine
Idaho Springs, Clear Creek County, Colorado
Mine I.D. No. 05-03935

Investigators

Thomas E. Barrington
Mine Safety and Health Inspector

Jack Eberling
Mine Safety and Health Inspector

George H. Gardner Jr., P.E.
Civil Engineer

Originating Office
Mine Safety and Health Administration
Rocky Mountain District
P.O. Box 25367, DFC
Denver, Colorado 80225-0367
Irvin T. Hooker, District Manager

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OVERVIEW

James Hull, front-end loader operator, age 26, was fatally injured on August 27, 2005, when rocks rolled and struck the front-end loader he was operating. Hull was removing rock material that a second front-end loader had dumped from an upper bench.

The accident occurred because standards and controls were inadequate and failed to establish procedures prohibiting entry into areas where ground conditions created hazards for work or travel. The areas were not barricaded or posted to prevent extraction on the lower benches while mined materials were deposited from the upper benches. Failure to recognize the hazard of performing work near the falling rock material contributed to the accident.

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GENERAL INFORMATION

The Walstrum Quarry, a surface granite operation, owned and operated by Albert Frei & Sons, Inc., was located off Interstate 70, one mile east of Idaho Springs, Clear Creek County, Colorado. The principal operating official was Albert R. Frei, Jr., president. The mine normally operated two 10-hour shifts a day, five to six days a week. Total employment was twenty-five persons.

Rock was mined from the quarry at multiple benches by drilling and blasting. A front-end loader was used to deposit the shot rock over the highwall perimeter.

As the rock material from the upper bench was deposited over the highwall slope, the benches below were filled to a natural angle of repose. Once the benches were filled, the rock material typically reached the third bench where a second front-end loader would load the material and haul it to the primary crusher. The rock material was crushed, screened, and stockpiled. Finished products were sold for use in the construction industry.

The last regular inspection of this mine was completed on September 2, 2004.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, James Hull, (victim) reported for work about 5:45 a.m., his normal starting time. His duties included feeding material into the plant hopper. Thomas Reynolds, quarry foreman, told Hull to clear the dropped rock in the south end of the east highwall on the third bench and blend it with the rock brought in from an offsite construction project. When the south end was loaded out, Hull was to travel to the middle highwall and perform the same task.

While Hull was working at the south end, Charles Broad, Jr., loader operator, arrived on the upper bench in another front-end loader. Broad was hauling blasted material and depositing it over the highwall edge at the north end of the east highwall. The dumped rock flowed about 185 feet to the third bench. Hull and Broad were able to communicate with two-way radios onboard each loader.

A maintenance area was established adjacent to the east highwall. On the day of the accident, Steven W. Lutz, mechanic, was at the maintenance area repairing the radio on a front-end loader and listened to the radio conversation between Hull and Broad. Hull asked Broad to switch dump locations on the east highwall so Hull could extract the material Broad had been depositing off the north end. Broad agreed and followed a company procedure to show Hull where he would start dumping. The two loader operators confirmed the location and Broad began depositing the rock material off the east highwall south dump. Broad radioed Hull after he had dumped three buckets and asked Hull if he was clear of the falling material. Hull responded that the dump location was well to the south of his

location. Broad stated he had no other contact with Hull after that. Lutz confirmed the conversation.

About 12:30 p.m., Lutz was traveling nearby where Hull had been loading and noticed Hull's loader was not moving and the rear window was out. Lutz parked the loader he was operating, ran to Hull's loader, and called Frei to inform him Hull was injured and to call for emergency medical assistance.

Lutz and Frei administered first aid until local emergency personnel arrived. The victim was transported to a nearby medical center where he was pronounced dead. Cause of death was blunt force trauma.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 1:10 p.m., on August 27, 2005, by a telephone call from Albert R. Frei, Jr., president, to Michael T. Dennehy, supervisory special investigator. An investigation was started the next day. An order was issued under the provisions of Section 103(k) of the Mine Act to ensure the safety of miners. MSHA's accident investigators traveled to the mine, made a physical inspection at the accident scene, interviewed employees, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management and employees.

DISCUSSION

Location of the Accident

The accident occurred at the toe of the east highwall on the third bench. The east highwall consisted of several benches that started at the third bench and rose 185 feet to the fifth bench.

Production Cycle

At the time of the accident, active mining was being conducted at the southern end of the east highwall on the fifth bench. Blasted rock was being transported by front-end loader bucket to the north and south dumps approximately 18 feet apart.

The rock dumped from the fifth bench channeled to the third bench until a uniform bank of rock material was created. Once the benches were filled with rock material, additional material slid, fell, or rolled down the bank by gravity to the lower benches. The resulting bank of shot rock assumed the material's natural angle of repose of about 40 degrees. The rock materials dumped over the bank in this manner generally flowed down to the third bench running out from the toe of the bank. At the time of the accident, the bank was approximately 185 feet high. From the third bench, a front-end loader moved the material approximately 300 feet to the jaw crusher and processing facilities.

Although the equipment operators could not see each other, they could communicate with radios located in the cabs of the front-end loaders.

Each dump location had a channel running down the bank where most of the rock flowed. Rocks, which were dumped at the north and south dump areas, were observed out as far as 80 feet from the toe of the bank on the third bench. In order to load out all of the deposited rock, the loader on the third bench cleaned this area to the toe of the bank. Large rocks typically came to rest about 30 to 40 feet out from the bank. In addition, the rock spread laterally over a distance of more than 150 feet when deposited from each location.

There was no evidence that the loader cut into the toe of the bank or that there was any mass instability of the bank at the accident site. Numerous rocks were observed lying very loosely on the slope of the bank. Even when there was no mining activity at the top or bottom of the bank, small rocks were observed rolling or sliding down the bank.

Front-End Loader

The front-end loader involved in the accident was a 2002 Komatsu WA 900, with a 17 yard bucket and rated at 853 horse power. The loader was 17 feet high, 47.4 feet long with the bucket down, and had a normal reach of 31.9 feet. It was provided with a retractable three inch seat belt. The examination of the loader found no defects that could have contributed to the accident.

When found by Lutz, the loader was in the reverse gear and the back-up alarm activated. Before Lutz arrived, the front-end loader had backed away from the toe of the bank approximately 12 to 14 feet before stopping. When the loader was turned off, the transmission went to a park mode and the park brake set. These features functioned automatically as required.

Impact points to the exterior areas of the front-end loader were noted as follows; on the front-end loader at the right lift boom, on the right front fender which was bent down on the front edge, on the Roll Over Protective Structure at the forward right corner. The right top light was broken away, and the lower right area of the forward windshield was damaged. The right side hand rail was damaged.

Inside the cab, several areas also indicated contact. The right side of the steering wheel, the dashboard, and the onboard boom control were damaged. The top left corner of the left access door was damaged. The forward windshield indicated two distinct points of contact. The safety glass separated at the point of contact into two sections, with one portion under the left front tire, while the remainder was lying in the cab.

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Two rocks were found on the rear deck behind the cab during the investigation. One rock, estimated at 900 pounds, had been removed during the rescue efforts and placed on the rear deck of the loader, behind the broken rear window. Another rock, estimated at 70 pounds, lay on the engine cover. Contact patterns in the windshield and cab interior indicated the rock had passed through the cab before striking the right air cleaner cover and the right muffler before coming to rest. Both rocks were removed from the loader and matched to a larger rock on the ground, south of the loader. Yellow paint, matching the color of the wheel loader, and the placement of the three rocks together indicated that the large rock had struck the loader and broke into three pieces.

Environment

On the day of the accident, the skies were clear with a temperature of approximately 88 degrees Fahrenheit. A light rain had fallen earlier in the morning but did not contribute to the accident.

Training and Experience

James Hull had 4 years, 4 weeks mining experience and had been employed at this mine for 3 years, 40 weeks. He had not received annual refresher training in accordance with 30 CFR, Part 46.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following causal factors were identified:

Causal Factor: Procedures had not been established that isolated areas where falling or sliding materials could create a hazard.

Corrective Actions: Management should develop and implement a policy requiring barricades or other devices that prohibit entry into areas where falling material create hazards to employees.

Causal Factor: The victim failed to recognize the hazard associated with performing work near falling materials.

Corrective Action: Employees should be trained to Stop, Look, Analyze, and Manage (SLAM) each task to evaluate possible hazards and ensure steps are taken to safely perform the task.

CONCLUSION

The accident occurred because standards and controls were inadequate and did not establish procedures prohibiting entry into areas where ground conditions created hazards for work or travel. The areas were not barricaded or posted to prevent extraction on the lower benches while mined materials were deposited

from the upper benches. Failure to recognize the hazard of performing work near the falling rock material contributed to the accident.

ENFORCEMENT ACTIONS

Order No. 6313635 was issued on August 27, 2005, under the provisions of Section 103(k) of the Mine Act:

> A fatal accident occurred at this operation on August 27, 2005, when a miner attempting to excavate material in a Komatsu WA900 front-end loader to feed the plant primary was struck by a rock that rolled from the bench above from an undetermined position. This order is issued to ensure the safety of all persons at this operation. It prohibits all activity beneath the highwalls and pull points in the mine until MSHA has determined that it is safe to resume normal mining operations in the area. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or resume operations in the affected area.

This order was terminated on September 9, 2005. Conditions that contributed to the accident have been corrected and operations can resume.

Citation No. 6317344 was issued under the provisions of Section 104(a) of the Mine Act for a violation of 56.3200:

> A fatal accident occurred on August 27, 2005, when a front-end loader operator was struck by rock at the quarry's east bank. The loader was operating at the base of the bank when the accident occurred. Ground conditions in this area created a hazard to miners working and traveling in this area of the 3rd level. This area was not posted with a warning sign or barricaded to impede unauthorized entry.

This citation was terminated October 11, 2005. Management implemented a procedure requiring that the third bench area is barricaded and that all traffic into this area is blocked when material is dumped from the fifth bench dump points. All miners were trained regarding this procedure.

Approved by, Date: December 13, 2005

Irvin T. Hooker
District Manager

APPENDICES

A. Persons participating in the investigation
B . Sketch of the accident scene

APPENDIX A
Persons Participating in the Investigation

Albert Frei & Sons, Inc.

Albert R. Frei, Jr.	president
Thomas C. Reynolds	quarry superintendent
Charles R. Board, Jr.	loader operator

State of Colorado

William C. York-Feirn	program coordinator
Joseph Sameks	deputy mine inspector

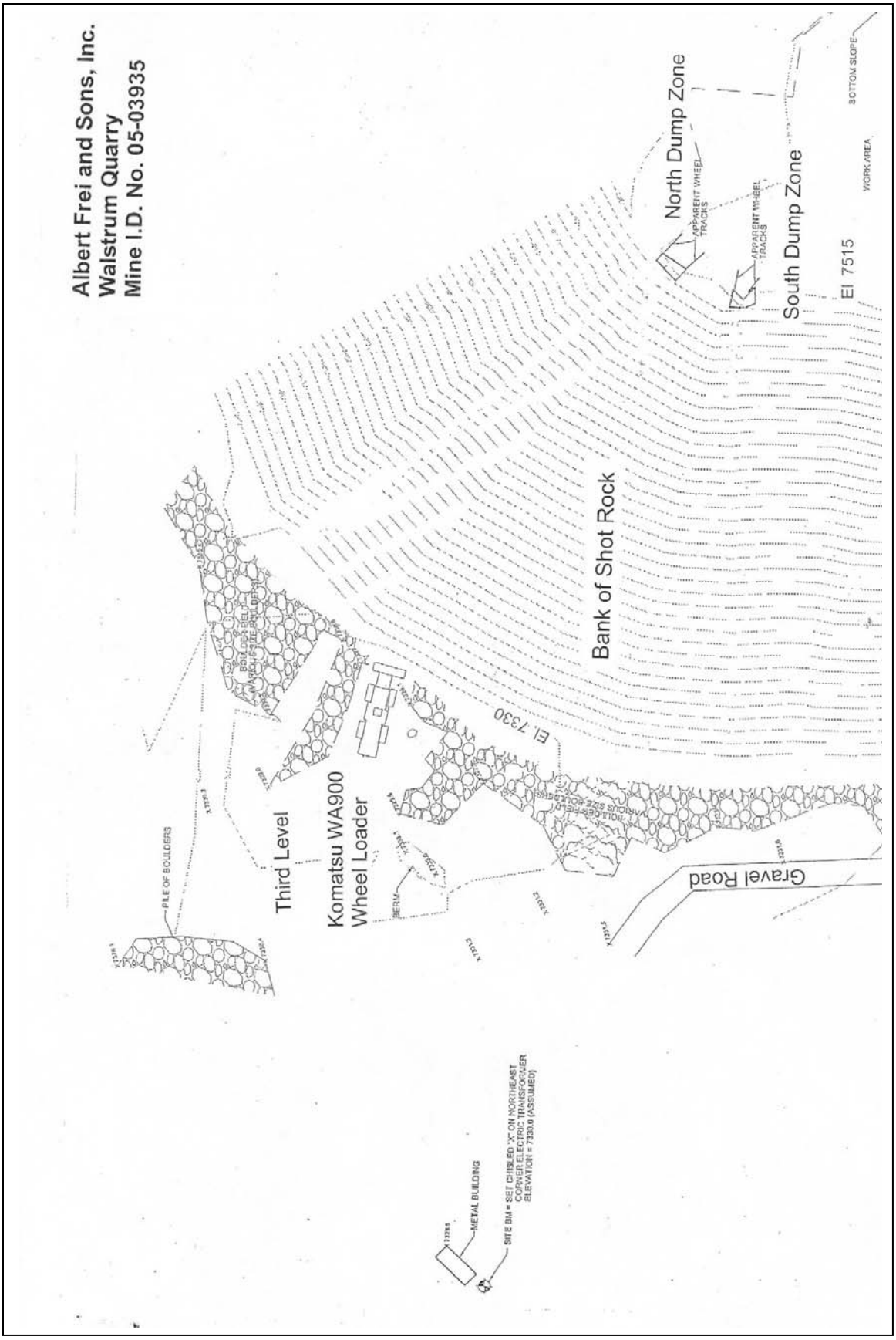
Jackson & Kelly

Timothy Olsen	attorney

Mine Safety and Health Administration

Thomas E. Barrington	mine safety and health inspector
Jack Eberling	mine safety and health inspector
George H. Gardner, Jr., PE	civil engineer

APPENDIX B


Albert Frei and Sons, Inc.
Walstrum Quarry
Mine I.D. No. 05-03935
North Dump Zone
South Dump Zone
El 7515
Bank of Shot Rock
El. 7330
Third Level
Komatsu WA900
Wheel Loader
Gravel Road
METAL BUILDING
PILE OF BOULDERS
BERM
BOTTOM SLOPE
WORK AREA